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ABSTRACT

A study examined whether students in synchronous distance education settings experience anxiety, reluctance, and frustration (i.e., communication apprehension) when using technologies to interact and, if so, what factors (e.g., prior experience with technology) might function to attenuate such negative reactions. Measures of traitlike- and state-communication apprehension (CA) were used to assess 385 undergraduate students' levels of apprehension in such settings. In addition, a measure to determine the existence of a context based technology-CA was created and administered. Results indicated that some students experienced a high degree of state-CA in synchronous distance education. The level of state-CA showed a negative correlation with prior experience suggesting that students who actively used distance education technologies exhibited lower levels of state-CA. The technology-CA measure showed correlational patterns consistent with other existing communication apprehension contexts indicating that communicating via technology may be a context in which some students become consistently apprehensive. (Contains 14 references and 4 tables of data; an appendix contains the survey instrument.) (Author/RS)

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Communication Apprehension in Synchronous Distance Education

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Communication Apprehension in Synchronous Distance Education

(Abstract)

This study examined whether students in synchronous distance education settings experience anxiety, reluctance, and frustration (i.e., communication apprehension) when using technologies to interact and, if so, what factors (e.g., prior experience with technology) might function to attenuate such negative reactions. Measures of traitlike- and state-communication apprehension (CA) were used to assess students' levels of apprehension in such settings. In addition, a measure to determine the existence of a context based technology-CA was created and administered.

Results indicated that some students experienced a high degree of state-CA in synchronous distance education. The level of state-CA showed a negative correlation with prior experience suggesting that students who actively used distance education technologies exhibited lower levels of state-CA. The technology-CA measure showed correlational patterns consistent with other existing communication apprehension contexts indicating that communicating via technology may be a context in which some students become consistently apprehensive.

Communication Apprehension in Synchronous Distance Education

When faced with communication encounters that they perceive as particularly threatening, many individuals report experiencing mild to debilitating anxiety and hesitancy. This phenomenon is referred to as communication apprehension (McCroskey 1977). In the educational arena, students experiencing high levels of communication apprehension not only suffer anxiety and hesitancy, but also decreased cognitive performance levels (Bourhis and Allen 1992), indicating that students with a high level of communication apprehension are disadvantaged in the classroom.

Today's students are given more opportunities than ever before to engage in educational communication, as audio/visual technologies used in synchronous distance education now enable real-time interaction between teachers and students separated by thousands of miles. Students in synchronous distance education courses can communicate with instructors and other students through microphones, video cameras, and television monitors. Although researchers in the field of speech communication have focused on the implications of communication apprehension in traditional classroom settings, this phenomena is not well understood in the distance education classroom.

With this in mind, the purpose of this study was to determine the relationship between technology and students' communication apprehension levels in synchronous distance education. It was suspected that, although today's technology provides increased opportunity for communication, it may also have an effect on students' communication apprehension levels. Developing a better understanding of communication apprehension in this environment is crucial in prescribing appropriate interventions for students experiencing high levels of communication apprehension.

Communication Apprehension

Communication apprehension is generally conceptualized in the arena of oral communication and specifically defined as "an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey 1977, 78). Communication apprehension may stem from characteristics of the learner's personality, or the communication situation in which the learner is involved. A current summary of communication apprehension research (Richmond and McCroskey 1998) organizes the types of communication apprehension (CA) on a four-point continuum as illustrated below.

<---Traitlike-CA-----Context-based CA-----Audience-based CA-----Situational CA----->

Individuals with traitlike-CA feel its effects regardless of the nature of the communication encounter--it is a characteristic of their personality. Context-based CA is similar to traitlike-CA as it is a relatively enduring personality characteristic. However, individuals with context-based CA only experience high levels of communication apprehension in certain generalized contexts. For example, one person may be apprehensive communicating in public settings but not in interpersonal settings, while another person might be just the opposite. Audience-based CA levels are less influenced by the communication context and more influenced by the intended receiver or group of receivers. For instance a person might experience apprehension when talking to an authority figure but not when talking to a friend. Because this type of communication apprehension stems from situational constraints generated by the receiver or group of receivers, it is not viewed as a personality characteristic but rather as a response to a particularly threatening audience-generated situation. At the end of the continuum, purely situational CA occurs depending on the particular context, time, and receiver of a given communication situation. This type of communication apprehension is a "here-and-now" response caused by a specific combination of these variables creating situations that are perceived to be particularly threatening. In general, researchers use the term state-CA to

define and measure this type of communication apprehension (Booth-Butterfield and Gould 1986; McCroskey and Beatty 1984).

Although little research has examined the degree to which students experience frustration, anxiety, and reluctance when using interactive technologies to communicate, those studies that have report similar findings. Specifically, past research indicates that many students using interactive communication technologies were reluctant to press microphone buttons to make comments and had reservations about appearing on-camera (Nahl 1993; Comeaux 1995). In addition, students felt anxious about using the technologies to communicate (McHenry and Bozik 1995; Warren, Reid, and Krendl 1996). Taken together these findings indicate that some students may be experiencing high levels of communication apprehension in synchronous distance education. Even so, prior research has neglected to isolate and examine communication apprehension in synchronous distance education.

The aim of this study was three-fold. First, we sought to determine the level of state-CA experienced by students involved in distance education classes that utilize interactive technologies (i.e., two-way video/two-way audio, and one-way video/two-way audio systems). Second, we examined the relationship between students' levels of prior experience and familiarity with interactive technologies, and students' level of state-CA. Some researchers suggest that anxiety will decrease as students gain experience in, and become familiar with, distance education (Moore and Kearsley 1996). Third, we investigated whether there exists a type of context-based communication apprehension unique to technological communication environments (i.e., technology-CA).

Method

A single, survey-type instrument was constructed by combining three demographic questions, one state-CA measure, the Personal Report of Communication Apprehension, and additional measures to assess subjects' prior distance education experience. The level

of state-CA was assessed with the Communication Anxiety Measure: Form State (Booth-Butterfield and Gould 1986). This measure consists of 20 Likert-type questions regarding students' feelings about the communication situation they just completed. A summary of research findings on the Form State measure shows high reliability estimates, and apparent construct and concurrent validity (Beatty 1994a).

Prior research shows high correlations between measures of traitlike-CA and state-CA (Booth-Butterfield and Gould 1986), indicating students with traitlike-CA will also experience state-CA. The most common measure of traitlike-CA is the Personal Report of Communication Apprehension (PRCA) (McCroskey 1982). As previously mentioned, traitlike-CA levels are stable across communication contexts. The PRCA is composed of 24 Likert-type questions to assess communication apprehension across four generalized contexts: dyadic (interpersonal), public speaking, meeting, and small group communication encounters. As such, the PRCA may be used to measure context-CA in a specific context, or to measure overall traitlike-CA by combining scores from each composite. Each context is represented by six questions. A summary of reliability and validity estimates for the PRCA shows high reliability, and considerable construct and criterion-related validity (Beatty 1994b).

Communication via interactive technologies may be a generalized context in which some individuals consistently become apprehensive. As the PRCA does not include such a context, an experimental measure consisting of seven Likert-type questions regarding students' feelings about communicating via technology were developed and placed at the end of the PRCA.

Students' level of prior experience was assessed with multiple measures. First, a question regarding the number of distance education courses completed was included. Second, six questions regarding the number of students' prior experiences with microphones, video cameras, and other communication technologies was developed.

Finally, a measure consisting of three Likert-type questions was used to assess the level of students' familiarity with communication technologies.

The instrument was constructed to maintain reliability and validity for each measure. Demographic questions were placed at the beginning. The measures of prior experience and familiarity with interactive technologies were included on the first page. The Communication Anxiety Measure: Form State, and the PRCA were counterbalanced by alternating their placement on the second and third pages.

Subjects and Sampling

A stratified random sample of classes delivered over a one-way video/two-way audio delivery system at a large western university, and the population of classes delivered over a two-way video/two-way audio delivery system at the same institution were selected for inclusion in the study prior to the beginning of an academic term (10 weeks) in the spring of 1998. A list of the 47 classes offered over the one-way/two-way delivery system was used to stratify according to each academic college offering courses over the system (Education, Science, Business, Family Life, Humanities) and student academic level (undergraduate, graduate). Because there were no graduate humanities classes available to survey, the stratification resulted in seven categories of classes. Classes in each category were then assigned a computer generated random number. The two classes with the lowest numbers from each group were selected for inclusion in the study. Because of the manageable number of students enrolled in classes using the two-way video/two-way audio system, all students in these classes were included in the study.

Data Collection and Analysis

Survey disbursement and collection were administered by classroom facilitators at each remote site during the first week of the term. Facilitators were not informed of the research questions of the study. With permission from the instructors, surveys were administered to all but one of the classes selected for the study during the last 15 minutes of

the first class session. In the remaining class the survey was administered directly following the class session.

Based upon enrollment figures for the 19 classes included in the study, 646 students were available for the survey. Of these students, 385 returned completed surveys yielding a return rate of 60%. Surveys may not have been completed and returned due to students choosing not to participate in the study, instructors forgetting to leave the students time to complete the surveys, or facilitators at remote sites not distributing the surveys. Because the surveys were anonymous and distributed by facilitators at remote sites, it was logistically impractical to identify and contact nonresponders.

Pearson correlation coefficients were computed to examine the relationship between levels of communication apprehension and measures of prior experience with interactive technologies. Scores from each of the measures used were tested for reliability (see Table 1). Reliability estimates for obtained scores on both the PRCA ($\alpha = .9538$) and Form State ($\alpha = .9217$) measures were consistent with findings in previous studies (Booth-Butterfield and Gould 1986; McCroskey 1982).

Of the measures developed to assess technology-CA, prior experience, and familiarity, only the prior experience measure showed a satisfactory reliability coefficient ($\alpha = .8260$). While efforts to increase reliability showed no results for familiarity, removal of the following two items increased the estimate for technology-CA ($\alpha = .6041$): "I am uncomfortable speaking to another individual on the telephone" and "I feel comfortable speaking to a group during a conference-telephone call." In order to maintain this higher reliability estimate, references to the technology-CA measure will pertain to the measure after removal of these questions.

Each of the measures was analyzed for validity (see Table 2). Construct validity of the traitlike- and state-CA measures was supported by the strong correlation ($r = .597$) between them. Construct validity for each composite in the PRCA was supported by strong inter-composite correlations and correlations with traitlike-CA. Construct validity of

the prior experience and familiarity measures was moderately supported by their correlation ($r = .360$). This low correlation may be due to the low reliability estimate of the familiarity measure. Moderate correlations between the total PRCA, each PRCA context, and technology-CA support the criterion validity for this measure. Similar to the familiarity measure, low correlational strengths may be due to a low reliability estimate for this measure.

Findings and Discussion

Of the 385 students participating in the survey, the majority were undergraduates (82.0%), and females (64.8%). Most of these students were Business (37.1%) and Education (36.5%) majors. Other colleges represented included Science (11.3%), Family Life (7.9%), and Humanities (7.1). Most of the students in the sample had previously taken five or more classes delivered via distance education (52.9%). While the second largest group of students had previously taken no distance education classes (18%), the rest of the students had taken between one and four classes. Descriptive statistics for each of the measures in the survey are summarized in Table 3.

None of the statistics for each of the measures varied significantly with any particular demographically delineated subgroup. The average score on the Communication Anxiety Measure: Form State for the entire sample was 38.36, indicating a moderate level of state-CA in students participating in synchronous distance education. The average score on the PRCA was 65.89 denoting students in distance education classes are similar to students surveyed in prior studies in terms of traitlike-CA. The national average score on the PRCA is 65.

As would be expected, the range of state-CA scores, as indicated by the standard deviation, indicates half of the students experienced moderate to high levels of state-CA in synchronous distance education. These results suggest the frustration, anxiety, and reluctance observed in prior qualitative research studies (Comeaux 1995; McHenry and

Bozik 1995) may be experienced by more than a few distance education students. Because high communication apprehension students experience less academic success than their peers (Bourhis and Allen 1994), these findings raise a concern that some students may experience unique challenges in distance education environments.

Many of the statistics derived from the sample were significantly correlated at the 0.01 level. A matrix of the correlations between measures may be found in Table 4. Some of this significance may be attributed to the large sample size for the study ($N = 385$). The strength of relationship for practical significance (i.e., effect size) was determined by the following categorization: $r = .1$ indicates a weak effect, $r = .3$ indicates a moderate effect, and $r = .5$ indicates a strong effect (Pedhazur and Schmelkin 1991).

Prior experience showed a significant negative correlation with traitlike-CA ($r = -.237, p = .01$), which represents a weak to moderate effect, and a significant negative correlation with state-CA ($r = -.135, p = .01$), which represents a weak effect. Familiarity showed a significant negative correlation with traitlike-CA ($r = -.214, p = .01$), which represents a weak to moderate effect, and no significant correlation with state-CA ($r = -.084$). Although one measure, technology-CA, was significantly correlated with the number of distance education classes previously taken ($r = -.126, p = .05$), this represented a very weak effect; thus, no implications are drawn from this finding.

Past distance education researchers have suggested that as students' experience in distance education increases, their level of anxiety decreases (Moore and Kearsley 1996). However, the construct of prior experience has been loosely defined. As indicated by the lack of relationship between prior experience with distance education technologies and the number of previous distance education classes ($r = -.084$), students do not gain experience in distance education by simply sitting in a distance education class. Assuming students will become less apprehensive as they take more classes via distance education is questionable. In order to gain experience, it appears that students must actively use communication technologies.

Examining the correlations between prior experience with distance education technologies, and both state-CA ($r = -.135$, $p = .01$), and traitlike-CA ($r = -.247$, $p = .01$), shows that prior experience is more strongly correlated with traitlike-CA. This finding seems confusing unless the role of traitlike technology-CA is considered.

The technology-CA measure was developed to determine whether communication via technology was a context in which some students became consistently apprehensive. Significant correlations representing strong effects between technology-CA and both state-CA ($r = .449$, $p = .01$) and traitlike-CA ($r = .639$, $p = .01$) support the hypothesis that communication via distance education technologies is not only related to levels of state-CA, but also related to levels of traitlike-CA. In fact, the higher correlation between traitlike-CA and technology-CA suggests that technology-CA may be more closely related to traitlike-CA than state-CA. Technology-CA also showed similar correlational patterns to the measure of traitlike-CA and the individual composite measures included in the PRCA (see Table 4). These similarities provide further support for the proposal that there exists a technology-CA. Although the strength of each of these correlations is weaker than those for the contexts included in the PRCA, the reliability of the technology-CA measure is also lower than each of them. A more reliable measure may increase the strength of each of these correlations.

Summary

This study constitutes a first step in experimental research on communication apprehension in synchronous distance education. The purpose of this study was to determine the relationship between technology and students' communication apprehension levels in synchronous distance education. The findings indicate some students experience high levels of communication apprehension in this environment, and communication apprehension levels are negatively correlated with students' prior experience in using interactive technologies. Interventions to help highly apprehensive students should be

explored since students' experience in a distance education classroom may not be an adequate intervention. Communication researchers have developed and tested a number of interventions to help high communication apprehension students (Richmond and McCroskey 1998). These interventions should be examined in terms of applicability to the distance education environment.

More significantly, the overall findings of this study suggest the existence of technology-CA, a type of apprehension that has not been addressed in previous research. Comparable to other contexts included in the PRCA, technology-CA may also be an enduring, personality-type orientation toward communication in a given context (Richmond and McCroskey 1998). Because communication via technology will become more pervasive in the future, inquiry into the nature of technology-CA is crucial. Further development of the technology-CA measure is the next step in shedding more light on the nature of communication apprehension in distance education. The impact of interactive technologies on communication behavior must be better understood in order for administrators, instructors, and students to use these technologies effectively. It is our hope that future researchers will build on the findings of this study and advance the research of communication in synchronous distance education.

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Tables

Table 1

Reliability Coefficients for Each Measure

Measure	Alpha coefficient
PRCA	.9538
Form state	.9217
Familiarity	.5227
Prior experience	.8260
Technology-CA	.6041

Table 2

Correlations Between PRCA, PRCA Composites, and Technology-CA to Support Construct Validity

	Dyad	Sm. group	Pub. Spk.	Meeting	Traitlike	Technology
Dyad	1.0	.828**	.619**	.807**	.900**	.560**
Sm. group	.828**	1.0	.630**	.808**	.907**	.566**
Public spk.	.619**	.630**	1.0	.771**	.846**	.552**
Meeting	.807**	.808**	.771**	1.0	.846**	.626**
Traitlike	.900**	.907**	.846**	.941**	1.0	.639**
Technology	.560**	.566**	.552**	.626**	.639**	1.0

** p = .01

Table 3

Descriptive Statistics for Each Measure Included in the Survey

Measure	Minimum	Maximum	Mean	Std. deviation
Prior experience	0	30	20.54	7.58
Familiarity	0	15	6.12	2.63
Traitlike-CA	24	120	65.89	18.74
State-CA	0	77	38.36	14.28
Technology-CA	0	32	17.68	4.95

Table 4

Correlations Between Measures Included in the Survey

	Traitlike-CA	State-CA	Tech. App.	Prior exp.	Familiarity
Traitlike-CA	1.0	.597**	.639**	-.237**	-.214**
Form State	.597**	1.0	.449**	-.135**	-.084
Technology-CA	.639**	.449**	1.0	-.234**	-.267**
Prior Experience	-.237**	-.135**	-.234**	1.0	.360**
Familiarity	-.214**	-.084	-.267**	.360**	1.0
Group-CA ^a	.907**	.521**	.566**	-.215**	-.153**
Meeting-CA ^a	.941**	.573**	.626**	-.211**	-.179**
Dyad-CA ^a	.900**	.542**	.560**	-.241**	-.187**
Pub. Spk.-CA ^a	.846**	.511**	.552**	-.178**	-.248**

^a PRCA composite measure

** p=0.01.

Appendix

Distance Education Survey

This survey is part of a research project intended to study, and possibly improve the environment of your distance education classroom. Because incomplete surveys are unusable, please answer each question on the following three pages. Please **carefully read the instructions on each page**. This is an anonymous survey, responses to the questions will not affect your grade. Thanks for your participation!

Please circle the most appropriate answer to the following questions about yourself.

Student status?

Undergraduate Graduate

Gender?

Male Female

Major College?

Education HASS Family
Life Business Science

Number of distance education courses completed?

0 1 2 3 4 5+

The following questions relate to your experience with interactive technologies **prior to this class**. Circle the response to the statement that best answers the question.

- 1 2 3 4 5+ How many times have you seen yourself on a television screen?
- 1 2 3 4 5+ How many times have you spoken into a microphone?
- 1 2 3 4 5+ How many times have you used a video camera?
- 1 2 3 4 5+ How many times have you been video taped while speaking or communicating?
- 1 2 3 4 5+ How many times have you looked into a camera to be taped?
- 1 2 3 4 5+ How many times have you heard your recorded voice?

The following questions relate to your familiarity with interactive technologies **prior to this class**.

Choose the number from the following scale that describes you best in each statement.

Never					Almost Always
1	2	3	4	5	

- 1 2 3 4 5 At work I use microphones or video equipment to communicate.
- 1 2 3 4 5 I use microphones or video cameras while I am not at work.
- 1 2 3 4 5 I read about communication technologies such as video cameras, computer-conferencing software, or sound systems.

Instructions: The following items describe how people communicate in various situations.

Choose the number from the following scale that best describes how you felt during the communication experience you *just completed*

Not at all	Somewhat	Moderately so	Very much so
1	2	3	4

- 1 2 3 4 I felt tense and nervous.
- 1 2 3 4 I felt self-confident while talking.
- 1 2 3 4 While talking, I was afraid of making an embarrassing or silly slip of the tongue.
- 1 2 3 4 I worried about what others thought of me.
- 1 2 3 4 I felt calm when I was talking.
- 1 2 3 4 I felt ill at ease using gestures when I spoke.
- 1 2 3 4 I could not think clearly when I spoke.

- 1 2 3 4 My listener(s) seemed interested in what I had to say.
- 1 2 3 4 I felt poised and in control while I was talking.
- 1 2 3 4 My body felt tense and stiff while I was talking.
- 1 2 3 4 My words became confused and jumbled when I was speaking.
- 1 2 3 4 I felt relaxed when I was talking.
- 1 2 3 4 My fingers and hands trembled when I was speaking.
- 1 2 3 4 I felt I had nothing worthwhile to say.
- 1 2 3 4 I had a "deadpan" expression on my face when I spoke.
- 1 2 3 4 I found myself talking faster or slower than usual.
- 1 2 3 4 While speaking, it was easy to find the right words to express myself.
- 1 2 3 4 I felt awkward when I was talking.
- 1 2 3 4 My heart seemed to beat faster than usual.
- 1 2 3 4 I maintained eye contact when I wanted to.

Instructions: This instrument is composed of 24 statements concerning your feeling about communication with other people. There are no right or wrong answers. Many of the statements are similar to other statements. Do not be concerned about this. Work quickly, just record your first impression.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	2	3	4	5

- 1 2 3 4 5 I dislike participation in group discussions.
- 1 2 3 4 5 Generally, I am nervous when I have to participate in a meeting.
- 1 2 3 4 5 While conversing with a new acquaintance, I feel very relaxed.
- 1 2 3 4 5 Certain parts of my body feel very tense and rigid while giving a speech.
- 1 2 3 4 5 Engaging in a group discussion with new people makes me tense and nervous.

- 1 2 3 4 5 Ordinarily I am very tense and nervous in conversations.
- 1 2 3 4 5 Usually I am calm and relaxed while participating in meetings.
- 1 2 3 4 5 I am afraid to speak up in conversations.
- 1 2 3 4 5 I am tense and nervous while participation in group discussions.
- 1 2 3 4 5 I have no fear of giving a speech.
- 1 2 3 4 5 I am very calm and relaxed when I am called upon to express and opinion at a meeting.
- 1 2 3 4 5 I feel relaxed while giving a speech.
- 1 2 3 4 5 Generally, I am comfortable while participating in a group discussion.
- 1 2 3 4 5 Ordinarily I am very calm and relaxed in conversations.
- 1 2 3 4 5 Communicating at meetings usually makes me uncomfortable.
- 1 2 3 4 5 My thoughts become confused and jumbled when I am giving a speech.
- 1 2 3 4 5 I am calm and relaxed while participating in group discussions.
- 1 2 3 4 5 I have no fear of speaking up in conversations.
- 1 2 3 4 5 I am afraid to express myself at meetings.
- 1 2 3 4 5 I face the prospect of giving a speech with confidence.
- 1 2 3 4 5 I like to get involved in group discussions.
- 1 2 3 4 5 While giving a speech I get so nervous, I forget facts I really know
- 1 2 3 4 5 I am very relaxed when answering questions at a meeting.
- 1 2 3 4 5 While participating in a conversation with a new acquaintance, I feel very nervous.
- 1 2 3 4 5 I enjoy seeing myself speak on camera.
- 1 2 3 4 5 Using microphones and video cameras to communicate is impersonal and rude.
- 1 2 3 4 5 I am uncomfortable speaking to another individual on the telephone.
- 1 2 3 4 5 While being videotaped I am tense.
- 1 2 3 4 5 I feel comfortable speaking to a group during a conference-telephone call.
- 1 2 3 4 5 I am afraid to make comments during a class taught over distance education.
- 1 2 3 4 5 I dislike technology.